

ENERGY GOVERNANCE IN ARMENIA
Policy Recommendations

31 July 2017

Energy Community Secretariat



INTRODUCTION

Armenia is an Observer to the Energy Community Treaty since 2011. The country's economy suffered after the dissolution of the Soviet Union and to this day, it is still searching for a successful development model. Armenia has almost no relations with the two neighbouring countries, Azerbaijan and Turkey, including in the energy sector. Even the old existing infrastructure on the border with those two countries is not in use.

The entire energy sector is characterised by insufficient utilization of resources - limited utilization of substantial renewable energy resources, low efficiency of thermal and hydro power plants, relatively large electricity transmission and generation losses and incomplete realization of electricity export potential. The gas sector is completely monopolized by one supplier, which is protected even by an intergovernmental agreement. Under these conditions, it is questionable how much market liberalization is to be expected in that sector. In energy efficiency, Armenia is achieving visible results. The country's strategic documents are oriented towards a more extensive use of renewable energy sources, which seem to be the only way out of the very unfavourable energy supply situation. However, the policy instruments needed for such a strategy to succeed have not been developed sufficiently.

Armenia joined the Eurasian Economic Union in 2015. It has thus chosen a policy orientation, which does not completely comply with the *acquis communautaire*. In any event, there is broad agreement that energy policy reform following the basic principles of the legal framework upon which the European Union and the Energy Community Contracting Parties have successfully reformed their energy sectors would be beneficial also for Armenia.

By the present analysis, including the policy recommendations included therein, the Energy Community Secretariat makes an effort to assist Armenia, as an Observer to the Energy Community, to design and implement effective reform measures in the years to come. The policy recommendations in this analysis provide only a general orientation. Further analysis and fine-tuning of the proposed measures will still be needed. The Energy Community Secretariat stands ready to assist Armenia in policy reform if such assistance will be requested.

1. Electricity Market

Description of data [unit]		2014	2015
Electricity generation [GWh]		7.750,00	7.798,10
Net imports		205,80	173,60
Net exports		1.313,60	1.423,60
Total electricity supplied [GWh]		6.280,80	6.183,30
Losses in transmission [GWh]		138,90	129,00
Losses in transmission %		1,80	1,80
Losses in distribution [GWh]		789,90	686,80
Losses in distribution %		12,90	11,30
Consumption of energy sector [GWh]		361,40	364,80
Final consumption electricity [GWh]		5.352,00	5.367,50
Consumption structure			
Industry [GWh]		1.243,70	1.341,40
Household [GWh]		1.933,50	1.876,40
Others (transport, agriculture, public utilities, contraction, organization with budgetary financing) [GWh]		2.174,80	2.149,70
Capacity of power plants [MW]	Nuclear	385,00	385,00
	Thermal	1.029,00	1.060,00
	Hydro	903,80	965,00
	SHPP	287,43	344,10
	Wind	2,64	2,89
Horizontal transmission networks [km]	330 kV <i>n/o</i>		
	220 kV	1.417,30	1.419,50
	110 kV	3.253,20	3.273,40

Sources: PSRC of RA, MENR of RA

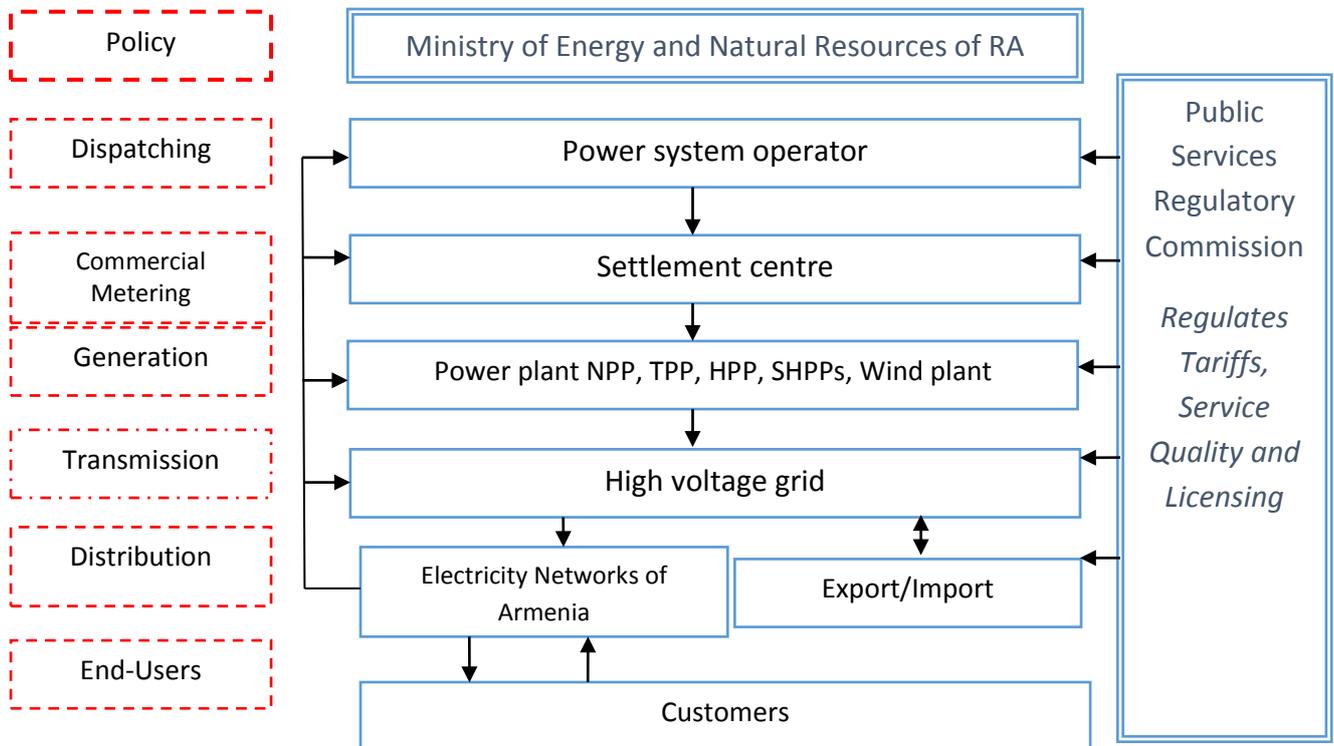
a. Sector Overview

In 1997, the Energy Law currently in force was adopted and the Public Services Regulatory Commission of Armenia (PSRC) was founded. Subsequently the restructuring of the power sector was initiated, based on the division of responsibilities among generation, transmission, dispatching and distribution. Thus, the staged transition from a vertically integrated management structure to the horizontally integrated one was put into action. The largest benefit of power sector reforms thus far has been the removal of the government's subsidies for power sector operations. At present, direct contracting between generators and the distribution company exists, which should form the basis for a gradual increase in the degree of liberalization of the market. The power sector is separated into three sub-sectors: generation, transmission and distribution. Transmission, dispatch and settlement companies are tasked with delivering power from diversely-owned generating facilities to a single, privately-owned distribution entity.

Armenia has no proven oil or natural gas reserves and imports all of its fuel for thermal generation from Russia and Iran. The country relies on imported natural gas to generate roughly 30 percent of its power and most of its heat. Armenia's dependence on imported fuels creates security of supply risks as well as affordability problems for customers. The sector is highly susceptible to fuel supply interruptions and price volatility. Due to disruptions in gas supply, customers suffered through several of Armenia's cold winters between 1991 and 1996 with little more than two hours of electricity supply per day. Meanwhile, the import price of natural gas has continued to increase. The increases of the price of imported gas led to steady increases in end-user tariffs for natural gas and electricity. Between 2005 and 2013, the end-user natural gas tariff increased by 170 percent. End-user residential tariffs for electricity increased by 52 percent during the same time period.

Electricity demand grew at an average annual rate of roughly 4 percent between 2004 and 2013, and is expected to continue to grow at a rate of around 2 percent per year. New generation capacity is needed since 50 percent of available capacity is more than 40 years old, and one of the largest generating units in the system, the remaining nuclear unit at Metsamor, is in urgent need of investment. Metsamor's retirement has been postponed twice, most recently from 2021 until the commissioning of the new nuclear power plant (expected in 2026) because of the difficulty in securing financing. If Metsamor is retired in 2026, without putting new generation capacity in place before, Armenia can expect a supply gap of roughly 830 MW, taking into account the base-case forecast average annual peak demand growth of roughly 2 percent per year. The current average cost of generation in Armenia is roughly 0,035 USD /kWh, but is set to increase to 0,10-0,19 USD /kWh should the gas price increase, and a new nuclear plant is brought online in 2026.

Armenia's Electricity Market Scheme



Source: MENR

b. Detailed Assessment

1. Authorization and Licensing

Performance of any electricity market activity requires a license from the Public Services Regulatory Commission. The licensing procedure is defined in the Energy Law and Energy Market Licensing Regulation. The Energy Law governs the energy sector in Armenia, including the power system, the thermal energy supply and the gas supply system. The oil sector is excluded. Generation of electricity, generation of thermal energy (including combined heat and power generation), transmission (transportation) and distribution of electricity, thermal energy and natural gas, system operator services in electricity and natural gas sectors, electricity and natural gas import and export, as well as providing power market services, can be conducted only after obtaining a license issued by the PSRC. By contrast, the following activities are not regulated:

- Generation, transmission and distribution of thermal energy exclusively for internal needs;
- Generation, transmission and distribution of thermal energy if the installed capacity does not exceed 5,8 MW;
- Construction of solar stations with capacity up to 150 KW; and
- Combined heat and power generation and generation of electricity in diesel power generation stations exclusively for internal needs.

The PSRC adopts model agreements for consumer contracts and authorizes all other contracts between licensed market participants. The licensing procedure takes up to 80 working days.

Licenses in the Electricity Market	
Type	number
Generation	185
Transmission	1
Distribution	1
Export	3
Import	3
Energy Services	2

Source: PSRC of RA, 31 December 2015

i. Generation

Generation of electricity may be performed by publicly and privately-owned generation companies. The MENR and PSRC authorize new generating capacities, including concessions.

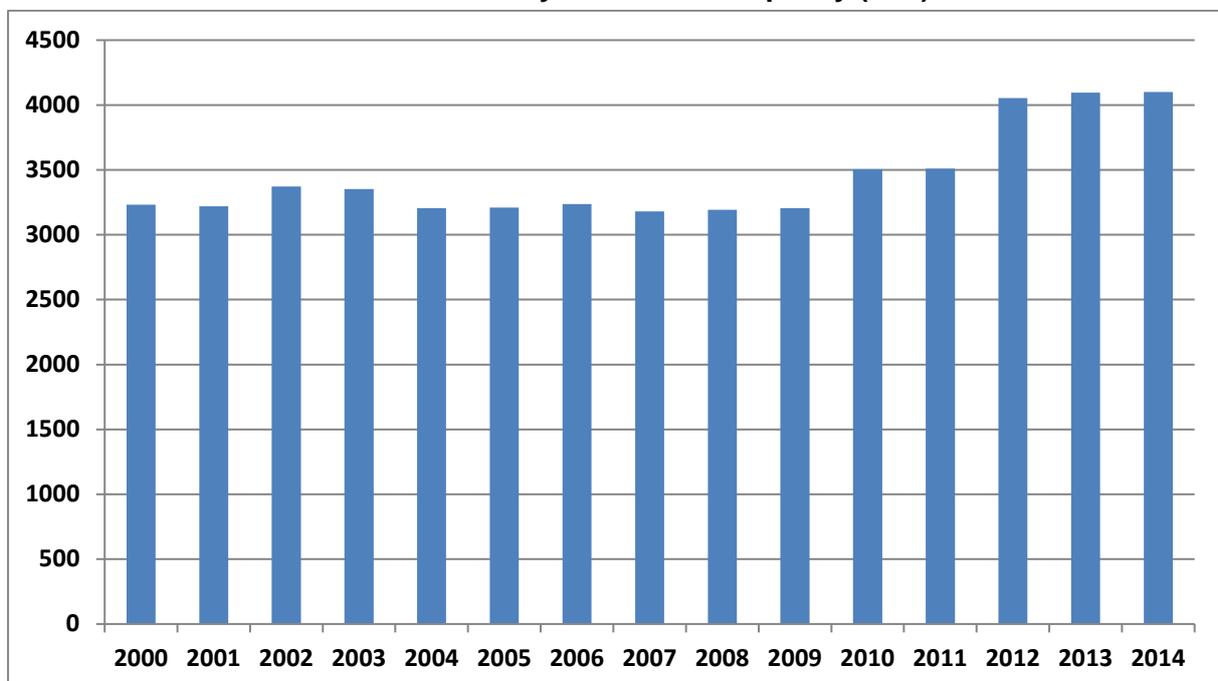
Electricity is produced from the nuclear power plant, hydro power plants (including small HPPs), and thermal power plants. Total installed power generation capacity is about 3 250 MW, out of which only 2 700 MW is used.

- a. The **nuclear power plant** (commissioned in 1980) is operated by the government-owned closed joint stock company *HAEK*. It is planned that the Armenian NPP is rehabilitated during 2017– 2018 and its lifetime extended up to 10 years. The expected costs are about USD 300 million.
- b. The **thermal power plants** are operated by two private companies (*RazTES* and *Gazprom Armenia*) and one government-owned undertaking (*Yerevan TPC*). *RazTES* operates Hrazdan TPP with an operating capacity of 400 MW (installed capacity of 1 110 MW), and an annual generation for the internal market of about 500 GWh (accounting for some 8 percent of domestic supply). *Gazprom Armenia* operates Hrazdan Unit 5 (commissioned in 2011) with an operating capacity of 440 MW (installed capacity of 467 MW), and an annual generation for the internal market of about 500 GWh (accounting for 8 percent of domestic supply). However, Hrazdan Unit 5 is more oriented towards exporting capacity. *Yerevan TPC* operates Yerevan CCGT (commissioned in 2010) with an operating capacity of 220 MW (installed capacity of 238 MW), and an annual generation for the internal market of about 950

GWh (accounting for 15 percent of domestic supply). The Yerevan CCGT is working under a gas-electricity exchange contract and exports about 500 GWh annually.

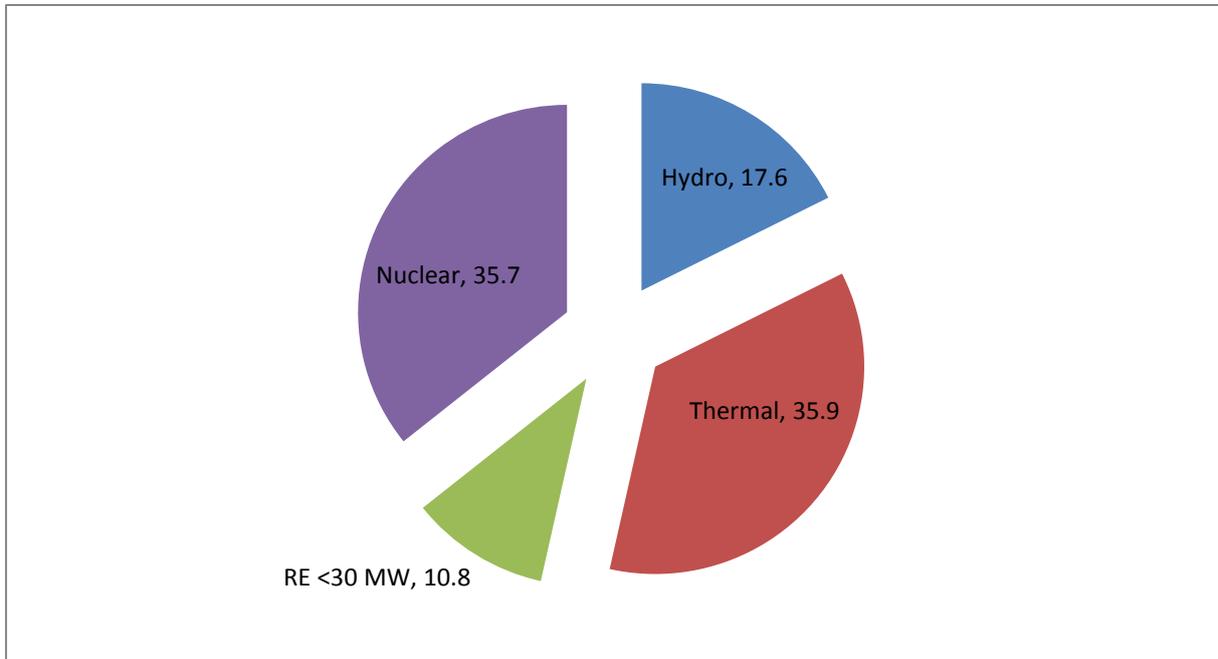
- c. There are two **large hydropower plants** in the country, Vorotan Cascade and Sevan-Hrazdan Cascade. Both are privately-owned. Vorotan Cascade was commissioned during 1970 to 1989 and is operated by *ContourGlobal Hydro Cascade*. It consists of three individual HPPs – Spandaryan (76 MW), Shamb (171 MW) and Tatev (157 MW). The overall installed capacity is 404 MW and annual generation is approximately 1 000 GWh, which covers about 15 percent of domestic supply. Vorotan Cascade’s assets are old and require extensive upgrading. A short-term rehabilitation plan with an investment cost of EUR 51 million is under development. Sevan-Hrazdan Cascade was commissioned during 1940 and 1962 and is operated by the *International Energy Corporation*. It consists of seven HPPs - Sevan (34 MW), Hrazdan (81 MW), Argel (224 MW), Arzni (70 MW), Kanaker (102 MW), Yerevan1 (44 MW) and Yerevan3 (5 MW), with an overall operating capacity of 552 MW (installed capacity of 560 MW). The annual generation is around 450 GWh, thus covering about 6 percent of domestic supply. Several upgrades were done on the Cascade’s power plants during the last 15 years. At present, the Yerevan HPP is under reconstruction with investment costs of USD 40 million.
- d. Other **renewables** consist of about 170 private small HPPs (under 30 MW), which were essentially constructed during the last 10 years. Their installed capacity is about 300 MW, and annual generation is approximately 700 GWh (covering about 11 percent of domestic supply). There are several small-sized wind, biomass and solar plants, which have limited impact on the overall electricity supply.

Installed Electricity Generation Capacity (MW)



Sources: National Statistical Services of RA, MENR of RA

Distribution of Generation Capacity in 2015 (%)



Source: PSRC of RA

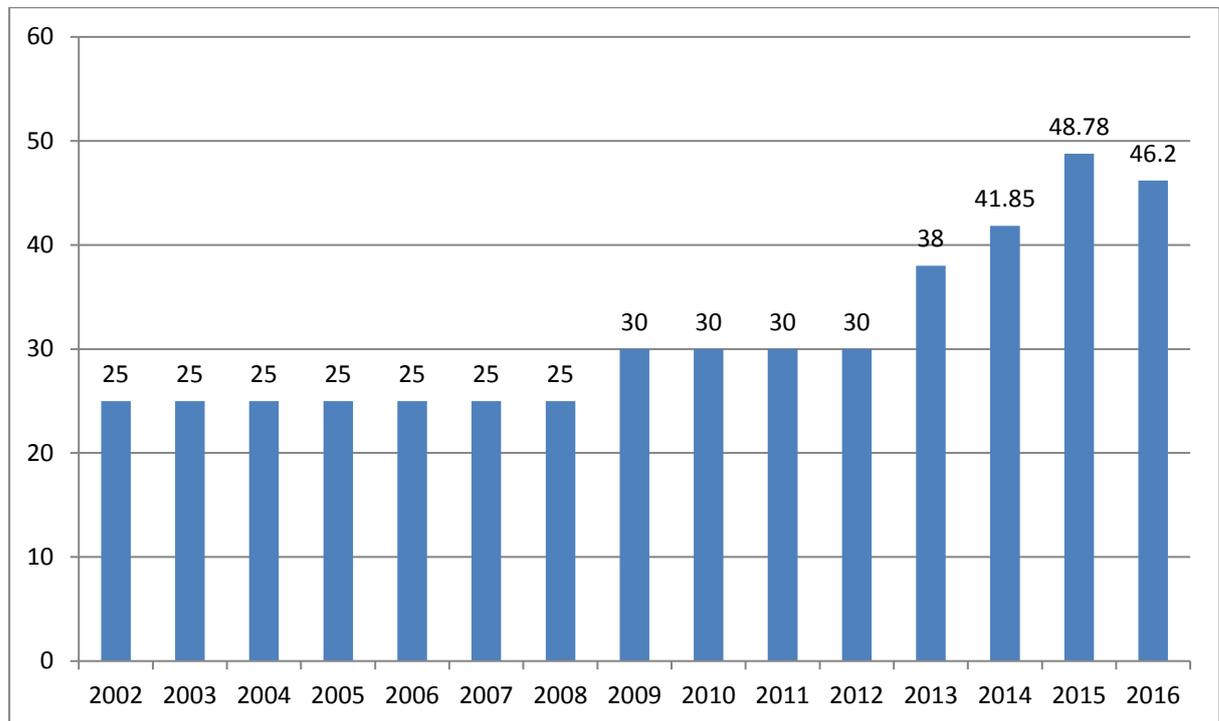
ii. Transmission

Transmission activity is fully regulated. The state-owned company *High Voltage Electrical Networks* owns the transmission network. The company transports electricity via 220–110 kV electrical networks. The system includes 14 substations of 220 kV, 2 substations of 110 kV (overall, 33 transformers with capacity of about 2,500 mega volt-amperes), 164 km of 330 kV lines, 1.320 km of 220 kV lines and 3.146 km of 110 kV lines. Transmission tariffs are approved by the PSRC. *High Voltage Electrical Networks* does not operate the system. The power system is dispatched by an Independent System Operator (ISO), which is a separate, government-owned company, *EPSO*. The ISO is also licensed by PSRC, and monthly fees are set for its operation of the transmission system.

iii. Distribution and Supply

Distribution and supply are also regulated activities. The private company *Electric Networks of Armenia* holds an exclusive license for distribution of electricity within Armenia, which includes supply. *Electric Networks of Armenia* distributes and supplies electricity to the population and other consumers in Armenia. The overall length of its grid is 36.000 km (the distribution system includes 0,4 to 110 kV lines and transformers). The company supplies electricity to 985.000 consumers. Power distribution and supply is subject to tariffs approved by the PSRC.

End-User Electricity Tariffs for AMD/kWh (low voltage consumer day tariffs)



Source: National Statistical Services of RA

Since 1 April 2009, the tariff for daytime usage was 30 AMD/kWh and the tariff for night-time usage was 20 AMD/kWh. Since 7 July 2013, the tariff for electricity was 38 AMD/kWh and 28 AMD/kWh respectively and, since 1 August 2014, 41,85 AMD/kWh and 31,85 AMD/kWh respectively. Since 1 August 2015, the tariff for electricity was 48,78 AMD/kWh for daytime usage and 38,78 AMD/kWh for night-time usage. Since 1 August 2016, the tariff for electricity was 46,2 AMD/kWh for daytime usage and 36.2 AMD/kWh for night-time usage.

2. *Unbundling*

Armenia initiated restructuring of its electricity sector through legal unbundling of production and transmission. Distribution and supply activities are not unbundled. MENR intends to prepare an action plan for further restructuring and separation of activities within the electricity sector.

3. *Third Party Access*

The Energy Law requires that transmission and distribution undertakings allow access to the grids for generation and import licensees pursuant to the provisions of the Market Rules. The network operators are obliged to transport the electricity provided that the implementation of third party access to the transmission and distribution network complies with system reliability, safety and technical rules and procedures. However, the law falls short of defining non-discriminatory regulated third party access for all system users.

4. Eligibility

The Law on Energy does not define eligibility. No customer in Armenia has a choice of supplier.

5. Market Opening and Price Regulation

The Armenian electricity market has not been opened yet and no formal opening timeframe is envisaged. Even though direct sale-purchase contracts between generators and the distribution company do exist, supply to end-customers is fully regulated and no liberalisation is envisaged in the current legal and regulatory framework.

The Energy Law states that any export/import transaction, before becoming effective, must be registered by the PSRC, which takes 10 working days. The importer/exporter must pay about USD 10.000 annually in license fees and provide a bank guarantee of about USD 1.000. The Market Rules further require exporters to sign contracts with a generation unit, the ISO *EPSO*, the transmission owner and the Settlement Centre. More importantly, the rules permit only Hrazdan Unit 5 or the Hrazdan thermal power plant to export power. All of this make export/import complicated.

According to the Energy Law, the PSRC sets the tariffs for electricity supply and network services. Tariffs are supposed to allow for the recovery of costs and a reasonable profit margin. The PSRC or the licensee can request a tariff review every six months.

Currently, the possibility of implementing partial or phase-by-phase power market liberalization is being discussed. The discussion is determined by concerns about technical problems due to insufficient capacities and interconnectors and a drastic increase of tariffs and social problems associated with the opening of the market, as well as the plans for a guaranteed purchase of electricity generated by renewables under 15-year power purchase agreements for SHPPs and 20-year power purchase agreements for solar, wind, biomass and geothermal.

6. Balancing

Balancing of the electricity system is fully regulated. A market balancing mechanism is in place. Balancing is not considered a separate activity but is performed by the electricity system operator, *EPSO*, and costs are embedded in the tariffs. A supervisory control and data acquisition system (SCADA) has been installed on generation units and 220 kV substations. Balancing costs are based directly on the generation costs, without generators or single customers taking balancing responsibility. Instead, the distribution company is taking over all responsibility, which through the tariffs is reflected in end-user prices. Adjustments are made annually, *ex post*, based on the generation costs.

7. Interconnections and Cross-Border Trade in Electricity

The Armenian electricity system is connected to Georgia (with an interconnection capacity of 200 MW, 110 kV and 220 kV in asynchronous operation), Iran (interconnection capacity of 300 MW, 220 kV in synchronous operation), Azerbaijan and Turkey (both not in operation). The construction of Armenia-Georgia and Armenia-Iran 400 kV OHL transmission lines, modernizing of high-voltage electricity grid substations and the implementation of the SCADA system are currently being implemented.

The realization of the North-South Power Corridor initiative will give a new impetus to energy cooperation between Armenia, Georgia, Iran and Russia, establish a regional power market and increase the reliability and energy security of the countries' power systems. As Armenia is synchronized with Iran, and Georgia is synchronised with Russia, the asynchronous operation between Armenian and Georgian power systems through back-to-back converters is being implemented.

There is no procedure for congestion management and cross-border capacity is not allocated via a market-based procedure.

8. Customers Protection and Protection of Vulnerable Customers

In order to protect consumer rights, the PSRC adopted Rules on Electricity Supply and Consumption in which the fundamental responsibilities of suppliers towards consumers are stipulated.

The government subsidises vulnerable families. No strict regulatory mechanisms to protect vulnerable customers are in place, but the government uses different mechanisms to support such customers.

9. Security of Supply

Based on the "Energy sector long-term (until 2036) development concept" and the "Programme-schedule of the events to be held in 2014-2020 providing for the implementation of the concept provisions", the main pillars of security of supply are diversification, regional integration and provision of infrastructure for generation, import and export, rehabilitation of transmission and distribution. Dependency on natural gas for generation of electricity is considered a systemic risk and requires diversification of primary energy sources and supply routes, along with the reduction of the share of natural gas generation in the generation portfolio. The development of local energy sources, especially from renewable energy sources, is considered important in order to increase the utilization of domestic resources in the electricity generation portfolio.

Another main pillar in terms of security of energy supply is the development of nuclear energy. Armenia has one nuclear power plant, the lifetime of which is to be extended by 10 years in order to cover electricity demand and maintain the necessary level of security of supply until a new nuclear power plant unit starts operation in 2027.

For improving security of energy supply and enhancing power export and transit potential, there is a need to improve the interconnection between Georgia and Armenia. The back-to-back interconnection project will connect the Armenian and Georgian power grid via a 500/400/220 kV converter station with a final capacity of 1.050 MW in Ayrum (Armenia). The connection from the Georgian side will be via a 500 kV line from the substation Marneuli and the connection from the Armenian side via a 400 kV line from Hrazdan. The overall project will be carried out in three subsequent stages. The estimated project cost for the first stage is approximately EUR 188 million. The final decision on the next two stages will depend on real power exchanges and trade opportunities through the new transmission infrastructure.

c. Policy Recommendations

Armenia should continue to reform its electricity sector through further restructuring of the industry, development and implementation of a new market model and changes to the legal and regulatory framework. Having only performed legal unbundling of transmission and dispatching, the immediate further steps should be unbundling and separation of distribution and supply activities, first legally and then also functionally. At the same time, clear rules on regulated third party access to the transmission and distribution networks applicable to all system users should be developed. Gradual liberalisation, starting from large industry and grounded on predefined criteria based on voltage level or consumption, should be introduced progressively by defining eligibility in the law and allowing customers to choose a supplier. Opening the market should entail defining balancing responsibility on market-based principles and amending the existing model in which the whole risk is taken by the distribution company but not by the generators and by single customers and other market participants. A new market model, replacing the existing single buyer one (which is currently performed by the distribution company), with defined timeframes should be developed and a national market operator should be established. Even though currently end-user prices reflect the costs and they have been increasing throughout the last years, in order to cushion any possible further increase of tariffs, a transparent subsidy scheme for vulnerable customers should be put in place.

It is very important that national reforms are complemented with reforms for implementing cross-border trade. Armenia would benefit from enhanced trading of electricity with Georgia, and thus it would be beneficial if the Armenian market model were harmonised with the Georgian one. In order to increase the trade potential, criteria and conditions for performing export and import should be simplified substantially. The capacity at the interconnectors should also be allocated and potential congestions should be resolved through a market-based mechanism, for which rules have to be developed and approved by the regulatory commission. Since Georgia is an Energy Community Contracting Party, it follows the EU rules for electricity market reforms. Having a harmonised market model and introducing gradually compatible rules for governing the Armenian electricity sector would also complement the obligations undertaken by Armenia within the Eurasian Economic Union, under which it has an obligation for establishing a wholesale electricity market by mid-2019.

2. Natural Gas Market

Description of data [unit]		2014	2015
Natural gas production [Bcm]		0	0
Import flows [Bcm]		2,4509	2,2922
Export flows [Bcm]		0	0
Stock changes [Bcm]		N/A	N/A
Total supply [Bcm]		2,2792	2,2124
Consumption in energy sector [Bcm]		0,8111	0,7551
	out of which: Energy transformation [Bcm]	0,7931	0,5712
Available for final consumption of natural gas [Bcm]		N/A	N/A
Interconnectors' capacity [Bcm]		N/A	N/A
	out of which bidirectional	N/A	N/A
Storage working capacity [Bcm]		0,1191	0,1487
Length of transmission network [km]		1.720,1	1.688,6
Length of distribution network [km]		14.136	14.330
Natural gas customers out of which:	Total	595.899	600.549
	out of which: Non-household	10..875	11.160
	Eligible customers under national legislation	0	0
	Households	585.024	589.389
Internal market	Gas supplied to active eligible customers [Bcm]	0	0
	Share of total consumption [%]	0	0
Final consumption of natural gas per sector [Bcm]		2,2692	2,1919
Consumption structure [Bcm]	Industry and commercial customers	0,8992	0,8653
	Households	0,5154	0,5266

Sources: PSRC, CJSC Gazprom Armenia

a. Sector Overview

Natural gas represents a significant percentage of the overall energy consumption in Armenia, including both for industrial and household needs and for energy generation (electricity and heat). Since Armenia has no domestic gas sources, the entire demand is met by imports from Russia (83%) and Iran (17%).

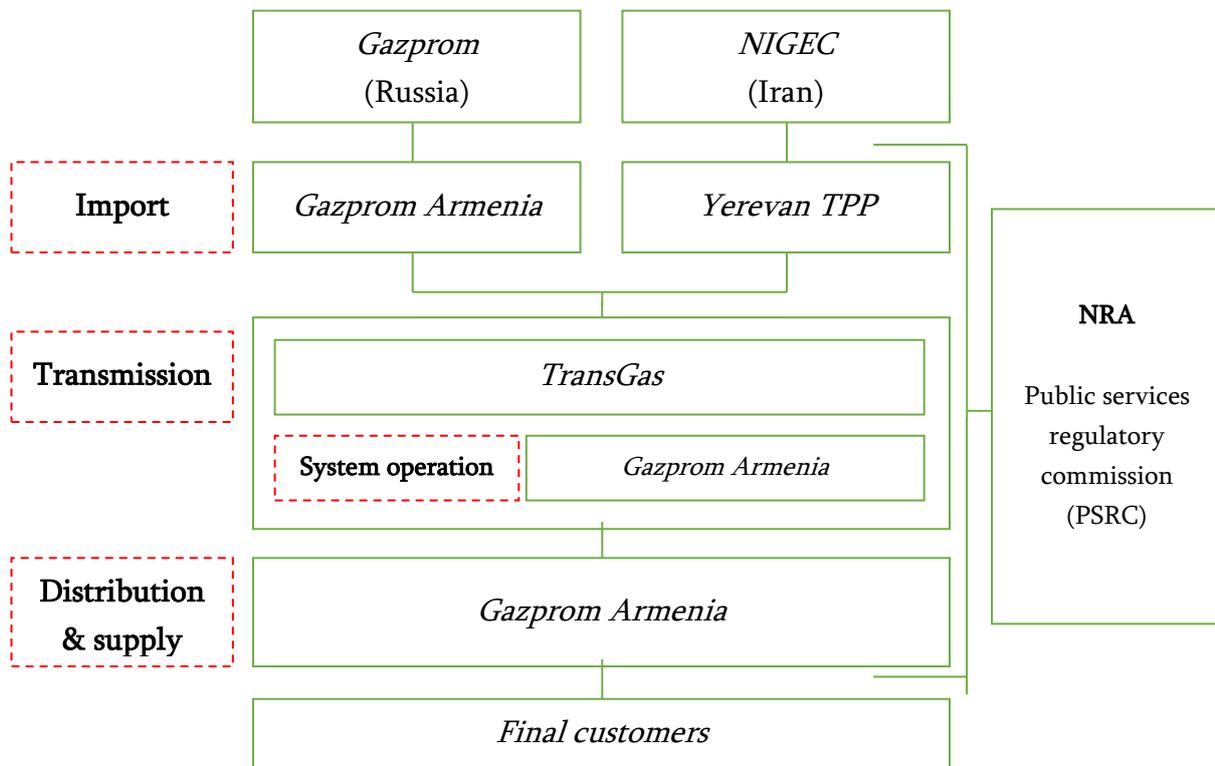
Armenia's gas market is fully monopolised. All gas activities are concentrated within the vertically integrated holding structure of *Gazprom Armenia*. The company, a 100% subsidiary of the Russian *Gazprom*, acts as a single gas distribution system operator and supplier, while its subsidiary *TransGas* operates transmission and storage systems in the country. *Gazprom Armenia* also possesses an exclusive right for gas imports from Russia under a long-term contract concluded with another *Gazprom* subsidiary, *Gazprom Export*. The gas transit route from Russia to Armenia goes through Georgia.

The commissioning of the gas pipeline between Iran and Armenia in 2008 opened the potential to diversify gas imports and to proceed with market opening. With an initial pipeline capacity of 1,1 bcm/y and its planned increase to up to 2,3 bcm/y by 2019, gas imports from Iran could satisfy almost the entire gas consumption demand in Armenia, which amounted to approximately 2,3 bcm/y in recent years. Supplies of Iranian gas to Armenia are commercially arranged in exchange for electricity exports from Armenia to Iran.

However, the Armenian part of the cross-border connection with Iran is owned by *Gazprom Armenia* and therefore is controlled by *Gazprom*. Due to political and economic influence, including *Gazprom's* contractual and pricing policies, imports from Iran still remain strictly limited and amount to only 0,15-0,2 bcm/y. Consequently, the potential of the Iran-Armenia pipeline remains politically and commercially blocked and currently has no significant effect on Armenia's gas market.

Armenia's only underground gas storage, the Abovyan UGS, is operated by *TransGas* and is exclusively used to secure the supply commitments of its holding company – *Gazprom Armenia* – in cases of gas transit disruptions. In 2013, the storage capacity was increased to 0,134 bcm.

Armenia's Gas Market Scheme



Sources: MENR, PSRC

b. Detailed Assessment

Organisation of the gas market and activities in the gas sector are governed by the Energy Law. The Energy Law establishes a legal framework which in fact underpins the market concentration and does not allow for competitive developments. None of the market principles established on European gas markets are in place.

1. Authorization and Licensing

Under the Energy Law, activities of gas transmission, distribution, import and export, operation of gas systems as well as construction of gas transmission and distribution networks are subject to licenses issued by the PSRC. The system operation license grants a licensee with an exclusive right for gas imports, transmission and storage within the entire territory of Armenia. No separate license is being issued for gas supply activities. Instead, a distribution licensee is entitled to supply final customers with gas within its distribution service territory.

Gazprom Armenia, *TransGas* and *Yerevan TPP* are the companies licensed for activities in the gas sector. The Energy Law explicitly precludes the entry of new market players. Firstly, gas may be imported to Armenia only by undertakings authorised by the PSRC, currently *Gazprom Armenia* (for gas imports from Russia) and *Yerevan TPP* (for gas imports from Iran in exchange for electricity). Secondly, even if the Energy Law allows for more than one

distribution licensee, *Gazprom Armenia* secures its monopoly over gas distribution and supply through its ownership of the entire distribution system in Armenia, and the fact that supply is conditioned on the distribution license. No entry of any supplier independent from distribution activities is allowed. Thirdly, a system operation license gives an exclusive right to operate gas transmission and distribution systems, including their development, thus eliminating even a theoretical possibility for construction of an alternative infrastructure.

2. Unbundling

The Energy Law does not establish any requirements for unbundling of gas transmission and distribution system operators.

Gas transmission activities are currently performed by *TransGas*. Whilst being a separate legal entity in terms of its organisation and decision-making, it remains fully dependent on the vertically integrated holding company *Gazprom Armenia*. Gas transmission infrastructure, including interconnectors and inland pipelines, is reported within the balance of *Gazprom Armenia*.

Gazprom Armenia is the only authorised gas distribution company. Being licensed by the PSRC for distribution activities, it is also granted with an exclusive right for gas supplies within the entire territory of Armenia. The company's distribution and supply activities are not unbundled.

3. Third Party access

No third party access to natural gas infrastructure is required under the Energy Law nor could it be claimed in practice by any interested party other than the incumbent gas undertakings, *Gazprom Armenia* and *TransGas*, which enjoy exclusive rights for their operations on the gas market.

In particular, *Gazprom Armenia* is the sole importer of gas to Armenia from Russia and, thus, has an exclusive access right to cross-border capacities. The company also owns the cross-border connection with Iran. Transmission and distribution system operators are not required to provide any third party access services and all system capacities necessary for the internal transportation or transit of gas are allocated between *Gazprom Armenia* and its subsidiary *TransGas*. Finally, storage capacities of Abovyan UGS are exclusively used for commercial needs of *Gazprom Armenia*.

4. Eligibility

None of the final gas customers in Armenia are allowed to freely choose or switch their supplier. Under the Energy Law, all customers are served by their incumbent gas distribution company. Independent supplies of natural gas are not allowed. In practice, all gas customers in Armenia are currently supplied by *Gazprom Armenia*.

5. Market Opening and Price Regulation

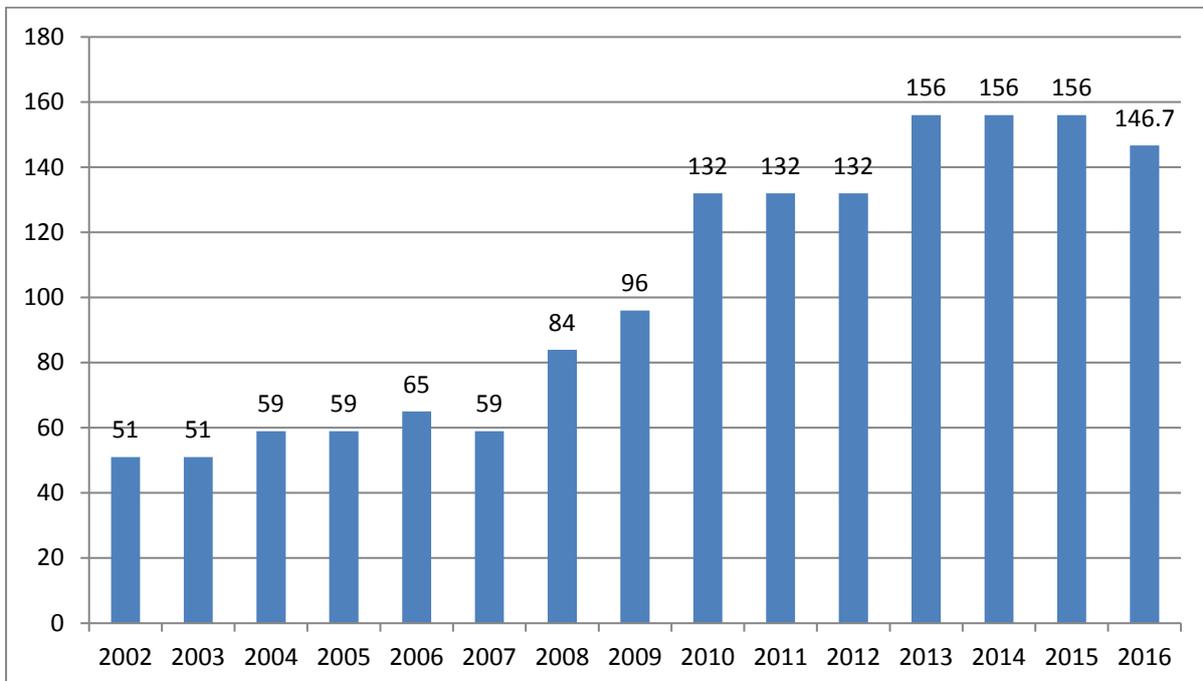
Concentration of the gas market in Armenia is embedded in the Energy Law. No company which does not own the gas distribution infrastructure and is not licensed by the PSRC for distribution activities may be authorised for gas supplies. Since *Gazprom Armenia* owns the entire Armenian gas distribution system and is the only entity entitled for its development, it completely secures its monopoly in supply and, consequently, completely forecloses the market.

At the wholesale level, the price for gas imported from Russia is set under the terms and conditions stipulated in the intergovernmental agreement between Armenia and Russia of 31 December 2013. Since April 2016, the natural gas price on the border of Armenia is equal to USD 150 per 1.000 cm. The intergovernmental agreement with Russia covers the gas pricing period until the end of 2018.

The price for gas imported from Iran is not defined due to a contractually arranged exchange of Armenian produced electricity for Iranian gas.

At the retail level, all final customers in Armenia are supplied with gas at regulated tariffs set by the PSRC. For 2016, a regulated tariff for final customers with monthly consumption not exceeding 10.000 cm equalled to AMD 146.700 per 1.000 cm (VAT inclusive). No deregulation of gas prices and market-based supplies are envisaged by the legislation currently in force.

Development of Regulated Tariffs for Final Customers with Monthly Consumption not Exceeding 10.000 cm (AMD/cm, VAT inclusive)



Source: National Statistical Services of Armenia

6. *Balancing Rules*

The legislation in force does not provide for market balancing rules. Balancing is considered as part of the regulated services provided by the system operator and the respective costs are included in the regulated tariffs. No market-based balancing mechanisms are applied.

7. *Security of Supply*

The concept of security of gas supply in Armenia is addressed by the Energy Law and further elaborated by the Presidential Decree of 23 October 2013. In particular, minimum security of supply standards, measures for cooperation with neighbouring countries and definition of a major supply disruption are missing. Measures and responsibilities in case of a national emergency are not clearly regulated.

By commissioning the Iran-Armenia gas pipeline and upgrading storage capacity of the Abovyan UGS, Armenia significantly increased its infrastructural potential in addressing security of supply issues in case of a disruption of natural gas deliveries from Russia. However, restricted use of alternative infrastructure and absence of third party access and market-based gas trading substantially restrains the practical benefits to be derived.

8. *Customer Protection and Protection of Vulnerable Customers*

Customer protection measures under the Energy Law are not elaborated and even minimal requirements are missing. In practice, all final customers are supplied by *Gazprom Armenia* based on regulated conditions and pursuant to the company's contractual practices, thus having no right to choose and switch their supplier or to invoke any other rights. Definition of and measures for protection of vulnerable customers are not provided by the Energy Law.

General consumer protection measures in Armenia are established by and enforced pursuant to the Civil Code and the Law on Protection of Customers' Rights. However, the absence of an explicit focus on protection of gas customers leaves a significant legal gap leading towards a clearly missing fulfilment of their rights in relation with gas undertakings.

c. *Policy Recommendations*

Opening of the gas market is the first and foremost priority for Armenia. The current absence of any competition and liquidity in the market does not only eliminate the customers' choice of potentially more favourable gas supplies, but also diminishes the country's investment attractiveness, which eventually leads to full dependency on gas imports from a dominant external supplier, price dictate and inability to exploit the existing and to develop new gas infrastructure as well as to address security of supply issues in a most efficient manner.

The development of Armenia's gas market requires substantial legal, regulatory, structural and corporate reforms, including unbundling of gas incumbents, ensuring the eligibility of all customers and opening of the market for new entrants. The very first obstacle for any further progress is the existing Energy Law, which embedded and legitimised a full concentration and foreclosure of the gas market.

3. Regulatory Authority

a. Organization, Competences and Assessment of Independence

The Public Services Regulatory Commission of Armenia (PSRC) is the single authority with nation-wide competences for regulating public services in the electricity and gas sectors. PSRC's competences also cover regulation of public services in the water sector, electronic telecommunications, postal services, railway transport and mandatory technical inspection of vehicles.

The regulator was established by the Presidential Decree on the Energy Commission of the Republic of Armenia of April 1997. In March 2001, the new Energy Law established the Energy Regulatory Commission, transformed in 2004 into the present Public Service Regulatory Commission of Armenia. PSRC's organisation and competences are further governed by the Law on the Regulatory Body for Public Services (the Regulator Law) as well as the Energy Law.

PSRC is composed of five commissioners out of which one is appointed as Chairman and one as Vice-Chairman. Commission members including the chairman and vice-chairman are designated by the President of Armenia upon proposal of the Prime Minister and serve a five-year term without renewal limits. A rotation scheme is in place and envisages a staggered one-year interval of appointments. Vacancies for commission members are not announced publically, the selection of successful candidates does not involve an independent committee and selection criteria are rather broadly defined by legislation, namely requiring Armenian citizenship, university degree and management as well as professional experience. The Regulator Law limits dismissal reasons for commissioners to physical impairment, loss of citizenship, disregard of duties confirmed by a related decision of the commission, criminal conviction, unmotivated and repeated absence and non-compliance with legal independence requirements.

The Regulator Law as well as the Energy Law define PSRC as independent from other public or private entities, including the prohibition to seek or take direct instructions from any of these bodies. The regulator has final decision-making powers. Decisions may be appealed (only) to the administrative court within a two-month period. According to the Regulator Law, commission members are prohibited from being a member of a political party or holding any other office or paid work, except for scientific, teaching and creative work to the extent not funded by a regulated entity. The same legal provisions forbid commission and staff members to hold shares or make other investments in regulated companies and impose on commissioners a three-year cooling-off period for positions in public service.

PSRC has wide-ranging competences in the gas and electricity sector, namely:

- Setting the tariff methodology and distribution and transmission tariff levels for electricity and gas, services provided on the energy market as well as maximum tariffs for electricity and natural gas import. According to the Energy Law, PSRC can either set tariffs or establish a methodology for calculating tariffs based on parameters defined in the Energy Law. PSRC or the relevant licensee can request a tariff review every six months. Once requested, a tariff review must be performed within 80 working days (for SHPPs and other renewables plants within 25 working days). The PSRC is authorized to set long-term tariffs for more than six months if considered necessary to provide investment security.
- Issuing licenses and authorizations, monitoring compliance with the licence conditions and applying penalties in case of incompliance;
- Establishing and controlling service quality standards;
- Establishing model forms or mandatory provisions for energy supply and service contracts to be signed between energy sector licensees and with consumers and registering B2B contracts as well as contracts for export and import of power and natural gas;
- Examining consumer complaints and disputes between licensees;
- Approving ex ante investment plans in the sector under its responsibility;
- Carrying out or organizing inspections of licensees and reviewing their financial-economic operations in order to monitor the implementation of license conditions;
- Imposing fines in case of non-compliance in the form of orders, suspension or revocation of licenses;
- Reviewing licensees' development-investment projects in order to make a decision as to whether the investments (fully or partially) will be included or rejected in the future tariffs; and
- Requesting from the licensees and license applicants all information and data necessary for the commission to issue a license, setting tariffs, settling disputes, or any other issues being addressed by the commission.

PSRC's budget is part of the state budget without a separate budget line. It is calculated based on the regulator's expenditures and financed from regulatory fees paid by regulated entities to the state budget and then shifted to the regulated entities' tariffs and system charges. PSRC's budget has to be submitted to the government for procedural processing and requires approval by the parliament. Ex post cuts or other interventions by other public bodies are not possible which grants the regulator the necessary financial certainty and autonomy.

PSRC management has autonomy on designing the authority's internal organisation, including hiring and dismissing staff. Both management and staff have civil servant status. According to the Regulator Law, staff and commissioner salaries are set by the commission within the respective budget limits.

PSRC ensures accountability of its activities by presenting its annual report to the parliament; approval of the report by an external body is not required. In addition, PSRC has

to present an annual financial statement and may be subject to auditing. The Regulator Law requires publication of decisions and transparency of the decision-making process.

b. Policy Recommendations

The present assessment is limited to a *de iure* compliance review and does not extend to an analysis of the *de facto* performance of the regulator as a truly independent authority which is actively designing the sectors under its responsibility. PSRC is by law independent from other private or political bodies. In addition, PSRC's decisions are final and the regulator is granted the necessary financial autonomy and the right to decide on its internal organization. The regulator has a broad scope of competences including enforcement rights.

However, some areas are not organised in a satisfactory way to allow full independence. In particular, the selection criteria for appointment of commissioners should be defined more precisely by law, e.g. including sector specific knowledge. Vacancies for commissioners should be published and a selection committee that is independent from politics and composed of neutral experts, e.g. from academia, think tanks or management of other public bodies, should be introduced. The existing cooling-off period for commissioners for positions in public services could also be extended to positions in the regulated industry. At the same time, shortening of the existing three-year cooling-off period should be considered having in mind that an over-restrictive cooling-off period might limit interest of highly-qualified persons from the industry in applying for a position in PSRC, which can be of even greater relevance in countries with small energy sectors such as Armenia.

Moreover, the PSRC's enforcement rights lack a financial component. The regulator should also be granted a separate budget line in the state budget.

4. Oil

a. Sector Overview

Armenia does not produce crude oil and has no oil refineries. All oil products are imported. Imports currently are at about 350.000 tonnes/year, mostly engine fuel (gasoline, diesel) in addition to LPG and jet kerosene. Oil product imports come mainly from Iran, Russia, Bulgaria and Israel.

Shipments of oil products are performed mostly by road and via a railroad linking Armenia to Georgia. The oil and oil products import market is fully liberalized. Several private companies are operating in Armenia including *Rosneft-Armenia*, *City Petrol Service*, *Max Concern*, *Flash Co.* and others.

As a member of the EAEU, Armenia agreed to integrate into a common market for oil and petroleum products of the Eurasian Economic Union starting from 2024. To fully implement the concept in 2024, EAEU members have to sign an international agreement on forming a common oil and petroleum product market.

The right conditions for oil and gas accumulations do exist in the country, and considerable effort has been devoted to create the preconditions for private investment in exploration and production. In 2012, the Government of Armenia adopted the decisions on the procedure for granting permission for mining for geological exploration of oil and natural gas and on a contract on production of oil and natural gas products. A draft law on features of oil and natural gas geological exploration and extraction has been developed.

b. Policy Recommendations

Armenia lacks emergency oil stocks and, therefore, should start the establishment of an emergency oil stockholding system, based on an adequate legislative framework.

5. Renewable Energy

a. State of Play, Legislation and Promotion of Renewable Energy

The Government of Armenia has worked for more than a decade to expand the use of renewable energy that would contribute to security of supply, reduce dependence of energy imports and mitigate the impact of energy use on the environment. With its favourable geography, Armenia has a high potential for producing energy from renewable resources like hydro, solar, geothermal and wind.

The 2004 Law on Energy Savings and Renewable Energy provided for, among others, the establishment of the Renewable Resources and Energy Efficiency Fund (R2E2), a non-governmental agency dedicated to promoting and facilitating renewable energy and energy efficiency in Armenia. R2E2, with the support of international and local financing institutions, implemented a Renewable Energy Programme aimed at removing barriers to the development of renewable energy generation and creating an enabling environment for private investors.

In 2007, the Public Services Regulatory Commission set renewable energy feed-in tariffs for small hydropower plants, wind and biomass to stimulate private investment. The feed-in tariff regime guarantees the purchase of all power generated by renewable energy plants for 15 years. Tariffs are adjusted annually in line with changes in inflation and exchange rates. The feed-in tariff has been successful in attracting private investments in more than 200 MW of small hydropower. More recently, the government took steps to streamline the process of developing renewable energy projects, including relaxing tax obligations for certain investments to alleviate the dependence on imported energy resources.

The government's renewable energy strategy is driven by the overarching goals of improving energy security, ensuring tariff affordability and maximizing the use of Armenia's indigenous energy resources. A 2013 Decree of the President of Armenia approved an "Energy Security Concept" for the country, which prioritizes the use of renewable energy resources. The government's Development Strategy for 2012- 2025 specifically calls for the development of indigenous renewable energy resources. Excluding the output from the existing large hydroelectric plants, renewable energy generation represented roughly 10 percent of total generation in 2015. The government is targeting hydropower generation to represent 21 percent of total generation by 2020, and 26 percent by 2025.

Construction of SHPPs in Armenia is a leading course of action towards development of the renewable energy sector and securing of the country's energy independence. As of 1 April 2016, according to preliminary data, electricity was produced by 173 SHPPs with total nominal capacity of about 310 MW and annual electricity production of 834 GWh; 44 SHPPs are under construction with total design capacity of 86 MW and 310 GWh annual electricity

production. The construction of solar power plants up to 70 MW and a 25 MW geothermal power plant is also currently underway.

Tariffs for Renewable Energy, 2016 (excluding VAT)

Renewables technology	Feed-in Tariff (AMD/kWh)
Small hydro-power built on “natural water systems”	23,753
Small hydro-power built on “irrigation systems”	15,832
Small hydropower built on “natural drinking sources”	10,556
Wind	42,645
Biomass	42,645

Renewable Energy Technology Targets

Technology	Capacity	Generation (GWh/yr)
Wind	795	1.640
Solar PV	835 – 1.169 ^a	1.735 – 2.118 ^a
Concentrating solar power	1.169	2.358
Distributed solar PV	93	128
Geothermal power	56 – 79	442 – 622
Landfill gas	2,5	19
Small hydropower	91	334
Pumped storage hydropower	450	2.252 ^b
Biogas	3,3	26
Biomass	29	228
Total (electricity)^c	1.904 – 2.233	4.552 – 5.115

^a Depends which solar PV technology is assumed to be deployed

^b Pumped storage projects do not “generate” new renewable energy, but store energy that has been generated elsewhere. So, the pumped storage number is excluded from the total.

^c Solar PV or CSP can be built in the solar “zones.” Therefore, the total includes only the generating potential for one of these technologies, so as not to double count.

b. Detailed Assessment

Armenia has adopted the Development Strategic Plan 2014-2025, where renewable energy is envisaged to play a significant role. However, neither binding renewable energy targets nor action plans detailing the measures to achieve the policy objective have been adopted. The Law on Energy Savings and Renewable Energy adopted in 2004 needs to undergo a major revision to comply with all requirements of Directive 2009/28/EC in electricity, heating, cooling and transport sectors.

The Energy Law of Armenia as amended in June 2014 has introduced policy measures to create a more favourable investment climate for the increased use of energy from renewable sources. These include renewable energy potential mapping, adoption of feed-in tariffs for various renewable energy technologies, 15 years guaranteed purchase of electricity for small hydropower plants, extended to 20 years for other renewable technologies, and a net-metering scheme for electricity self-consumption.

Armenia has not designated an institution to act as a one-stop shop for handling renewable energy applications, however, the government has established the Renewable Resources and Energy Efficiency Fund as an organization to facilitate investments and support investors. Armenia provides guaranteed access to the grid and priority dispatch for renewable energy, and the methodology for connection to the grid is transparent. Armenia issues power purchase agreements for 20 years after commissioning to all generation capacities from renewable energy sources, which could be too generous for some types of technologies.

So far, there are no support measures for promotion of the use of energy from renewable sources in heating and cooling. There are also no policy measures for the promotion of biofuels used in transport, even much less for the requirements of sustainability criteria for biofuels and bioliquids.

c. Policy Recommendations

The legal framework of Armenia should be revised to appropriately support the use of renewable energy for all types of energy consumption in the most cost efficient way. The government should adopt binding renewable energy targets for specific years and an action plan detailing the measures to achieve the policy objective.

6. Energy Efficiency

Main data and energy efficiency indicators		2010	2011	2012	2013	
Total primary energy supply (TPES)	ktoe	2.480	2.720	2.970	2.900	
Energy intensity (TPES/GDP)	Toe/1,000 USD	0,42	0,44	0,45	0,42	
TPES/Population	Toe/capita	0,84	0,92	1	0,97	
Total final energy consumption	ktoe	1.825	2.000	2.137	2.101	
Share of TFE sector by	Residential	%	29	31	31	31
	Services		6	6	6	6
	Industry		17	18	18	18
	Transport		27	26	25	25
	Others		1	1	1	1
	Non-energy use		20	18	19	19

Source: International Energy Agency

a. Sector Overview

While Armenia is one of the lesser energy intensive economies in the region, largely due to the structural changes in the economy, there is potential for further improvements. The Government of Armenia recognizes that improvement of energy efficiency will contribute to addressing the challenges of supply adequacy and security. The government has also taken important steps to encourage realization of the country's energy efficiency potential. In 2005, the country's parliament passed the Law on Energy Savings and Renewable Energy, creating a legal basis for implementation of energy efficiency measures in Armenia. The government also adopted the National Programme on Energy Savings and Renewable Energy, which identifies the sectors with the largest energy efficiency potential and provides an outline of technical measures/solutions to be taken to realize the identified technically viable potential.

In 2010, Armenia developed its first National Energy Efficiency Action Plan (NEEAP) to accelerate the implementation of its national energy efficiency policy. The first NEEAP set forth a set of programmatic and policy measures for energy efficiency improvement for all economic sectors of the country. The first NEEAP set an interim target of 3,3%, equivalent to 63,3 ktoe. The assessment of the first NEEAP revealed that this target has been outperformed: The interim energy saving target reached by 2014 was 8,6% (163,1 ktoe). Based on the assessed progress under the first NEEAP and the expected impact of the ongoing and new energy efficiency improvement measures, the second NEEAP proposes a new set of increased targets: 17,9% for 2017 (instead of the 10,4% proposed in the first NEEAP), 20,7% for 2018 (instead of 13,8%), and a higher overall target for 2020 - 37,6% (instead of 22,3%).

The country's second NEEAP for the period 2015–2020 is currently under development. The document is being prepared based on a template recommended by the Energy Community Secretariat. It will include an assessment of the first NEEAP's progress (2010-2015), set targets for the next 3-year period (2016-2018), as well as intermediate targets for 2019 and 2020. It also outlines the allocation of institutional roles and monitoring duties. The second NEEAP target for 2020 (36,7%) will require aggressive policy reform to accelerate energy efficiency in all sectors.

Legislative changes adopted in 2016 make it mandatory to fulfil energy efficiency and energy saving standards for newly constructed apartment buildings.

b. Detailed Assessment

Armenia's outdated Law on Energy Savings and Renewable Energy (adopted in 2004) should be updated in order for the country to align its laws with the Energy Community energy efficiency acquis, especially Directive 2012/27/EU on energy efficiency, and reap the full benefits of that endeavour.

Building construction norms, which cover construction sector requirements linked to energy efficiency, were revised and adopted on 26 June 2016 (state register code 11716202). However, this is still far from the requirements of Directive 2010/31/EU on energy performance of buildings.

c. Policy Recommendations

Armenia's energy efficiency legislation is progressing towards the implementation of the Energy Community energy efficiency acquis, including recent progress in the development of the second NEEAP, adoption of secondary legislation on energy efficiency information, labelling of appliances and energy performance of buildings.

However, Armenia currently applies an outdated Law on Energy Savings and Renewable Energy, which should be updated by aligning it with Directive 2012/27/EU on energy efficiency. Progress in implementation of energy efficiency measures and investment should

continue with adoption and implementation of the second NEEAP and establishment of an adequate system for monitoring and verification of energy savings and adequate reporting.

Moreover, further legislative changes are needed to fully transpose the Energy Performance of Buildings Directive and implement labelling schemes through adoption of labelling delegated acts.

The lack of enforcement of the existing energy efficiency legislation and regulation and the lack of capacities among central and local government authorities in initiating, designing, financing, managing and monitoring energy efficiency investments also need to be addressed.

7. Statistics

The Law on State Statistics determines the organization of state statistics in Armenia and regulates the obligatory collection, processing, compilation, summarizing and recordkeeping, as well as the analysis, exchange of statistical data, and the dissemination (publication) of statistical information.

Armenia publishes energy balances, but does not submit questionnaires to EUROSTAT according to the accepted methodologies (primarily because there is no legal basis to do so).

Armenia prepares and disseminates monthly statistics on production of electricity. The country also publishes and disseminates information on energy tariffs and prices charged consumers, but not according to EUROSTAT methodology.

Armenia does not prepare and disseminate monthly statistics on oil, natural gas and coal.

Policy recommendations

Armenia should substantially improve its management of energy statistics. The Law on State Statistics should impose on a statistical body an obligation to collect energy data in accordance with EUROSTAT methodology.

8. Competition

Armenia has adopted the Law on Protection of Economic Competition in 2000 and amended it several times. The law covers both competition and State aid issues and the powers of the competent authority.

The authority competent for the enforcement of this law is the State Commission for the Protection of Economic Competition of the Republic of Armenia (SCPEC RA). It is an independent state body implementing the state policy in the area of protection of competition. It has the power to monitor compliance with the Law on Protection of Economic Competition and to render decisions in case of violations of the law. It is also competent to undertake market inquiries, carry out inspections and impose remedies and penalties.

Policy recommendations

Armenia should focus on the effective enforcement of the Law on Protection of Economic Competition in the energy sectors by undertaking market inquiries, carrying out inspections and ultimately following-up on infringements of the cartel and/or State aid prohibition. This would also strengthen the independence of the SCPEC RA.

Abbreviations

AMD	Armenian dram
MENR	Ministry of Energy and Natural Resources
PSRC	Public Service Regulation Commission
EAEU	Eurasian Economic Union
CJSC	Closed joint stock company
HPP	Hydropower plant
SHHP	Small hydropower plant
TPP	Thermal power plant